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REMARKS

In the present Office Action, the Examiner indicated that claim 8 would be allowable if rewritten in independent form, rejected claims 1-3, 5-7 and 9-22 as being anticipated by United States Patent Number 5,801,483, issued to Watanabe et al. on September 1, 1998 (Watanabe et al.), and rejected claim 4 as being obvious in view of Watanabe et al. Applicant traverses these rejections and, for the reasons set forth below, submits that all pending claims are allowable over the cited reference.

The present invention is generally directed to improved lamps, such as fluorescent lamps, high intensity discharge lamps, and incandescent lamps, which emit light due to an electric discharge. More particularly, the invention is directed to lamps including an emissive element to improve the luminous efficiency of the lamps.

The lamps of the present invention include a glass tube having an emissive element and/or a protective layer including an emissive element. The emissive element forms part of the glass tube and/or part of a protective layer attached to the tube.

The tube may be formed, for example, by mixing a powdered emissive element and soda glass and then melting the soda glass (page 8, paragraph 3). Similarly, the barrier layer may be formed by melting a base material such as a metallic oxide and an emissive element to form the protective layer (page 20, paragraph 3).

In operation, an electric discharge under mercury vapor within the glass tube produces ultraviolet light (UV1), having a wavelength of about 254 nm. UV1, in turn, illuminates a

phosphor layer, coated on an interior portion of the tube, to produce visible light (V1). UV1 light also illuminates the emissive element to emit ultraviolet light of a greater wavelength (UV2) and additional visible light (V2). UV2, in turn, excites the phosphor layer to emit additional visible light (V3). The additional visible light, V2 and V3, produced as a result of the emissive element increases the efficiency of the lamp.

Watanabe et al. discloses a fluorescent lamp with a glass tube and one or two phosphor layers coated on an interior portion of the tube. The combination of the phosphor layers of Watanabe et al. include four luminescent compounds that produce visible and ultraviolet light having wavelengths in the range of 320 nm to 410 nm. Watanabe et al. also discloses a photocatalyst layer formed external to the glass tube.

Watanabe et al. fails to teach or suggest a glass or protective layer including an emissive element. The cited reference teaches emissive elements only as part of phosphor layers coated onto the glass tube and a photocatalyst layer formed external to the tube.

Watanabe et al. further teaches at column 3, lines 62-64 that:

The tube is made of soda lime glass which will not pass ultraviolet rays under 300 nm in wavelength.

Placing an emissive element within this tube of Watanabe et al. would render the claimed invention inoperable because ultraviolet light, having a wavelength of about 254 nm and produced as a result of excitation of mercury vapor, could not pass through a portion of the tube to excite the emissive element contained therein. It is generally settled that the change in a prior art device which makes the device inoperable for its intended purpose cannot be considered to be an obvious change. *Hughes Aircraft Co. v. United States*, 215 U.S.P.Q. 787, 804 (Ct. Cl. Trial Div. 1982). Accordingly, claims 1-22 are non-obvious in view of Watanabe et al.

Applicant further submits that the structural difference between the present invention and the lamp taught in Watanabe et al. are non-obvious and that the non-obvious difference provides advantages over the Watanabe lamp. In particular, Applicant submits that because the emissive element of Watanabe is in the phosphor layer instead of the glass or barrier layers as provided by the present invention, light emitted by the Watanabe lamp is attenuated compared to light emitted from Applicant's lamps. More specifically, the visible light that is produced by the emissive element in the phosphor layer is attenuated as it passes through the glass (or a protective layer if one is present), which is not the case for Applicant's lamps, which include the emissive element in the glass and/or barrier layer. Accordingly, none of pending claims 1-22 are taught or rendered obvious in view of Watanabe et al. The patentability of each of the claims in view of Watanabe et al. is discussed in detail below.

Claim 1 is not anticipated or rendered obvious in view of Watanabe et al. because Watanabe et al. does not teach or suggest "a fluorescent tube that is composed of glass...wherein the glass tube is made of a glass material that contains an emissive element." The Examiner asserts that Watanabe et al. teaches a glass tube (2) that contains an emissive oxide element, citing column 3, lines 32-42. Applicant respectfully disagrees with the Examiner's analysis of the cited reference. The luminescent material referred to at column 3, lines 32-42 is a phosphor layer 7, which is *coated onto* (rather than forming part of) the glass tube. Watanabe only teaches coating a portion of a tube with phosphor material including an emissive element and coating a portion of a luminaire with a photocatalytic material--it does not teach or suggest incorporating the emissive material into the glass. Accordingly, none of claim 1 or claims 2-5 that depend therefrom are anticipated or rendered obvious in view of Watanabe et al. Applicant therefore requests allowance of claims 1-5.

Claim 6 is not anticipated or rendered obvious in view of Watanabe et al. because Watanabe et al. does not teach or suggest "a fluorescent tube that is composed of glass...wherein the glass tube is made of a glass material containing an oxide of at least one element selected from the group consisting of titanium...lutetium." Instead, Watanabe et al. only teaches adding certain emissive elements to a phosphor layer (and not to the glass). Furthermore, Watanabe et al. does not teach or suggest the list of emissive elements in claim 6. Thus, claim 6 and claims 7-8 that depend therefrom are neither anticipated nor rendered obvious in view of the cited reference. Applicant therefore requests reconsideration and allowance of claims 6-8 (as noted above, the Examiner acknowledges that claim 8 is allowable over the cited reference).

Claim 9 is not anticipated or rendered obvious in view of Watanabe et al. because Watanabe et al. does not teach or suggest "a fluorescent tube having a protective layer," "a phosphor layer formed on the protective layer," or "wherein the protective layer contains an emissive element." Indeed, the Examiner has not even asserted that the cited reference teaches any of these elements. Accordingly claim 9 and claims 10-11 that depend therefrom are allowable over the cited reference and Applicant therefore requests allowance of claims 9-11.

For reasons similar to those presented above with respect to claims 9-11, claim 12 is not anticipated or obvious in view of Watanabe et al. because Watanabe et al. does not teach or suggest "a fluorescent tube having a protective layer," "a phosphor layer formed on the protective layer," or "wherein the protective layer contains an oxide of at least one element selected from the group consisting of titanium...lutetium." Applicant therefore earnestly requests allowance of claim 12 and claims 13-14 that depend therefrom.

Claim 15 is not anticipated or rendered obvious in view of Watanabe et al. for similar reasons provided above in connection with claims 1-5, namely, the cited reference does not teach

or suggest "an envelop...wherein the envelop is made of a glass material that contains an emissive element." Accordingly claim 15 and claims 16-17 that depend therefrom are allowable over the cited reference.

Similarly, claim 18 is also not anticipated or rendered obvious in view of the cited reference because Watanabe et al. fails to teach or suggest "an envelop...wherein the envelop is made of a glass material that contains an oxide of at least one element selected from the group consisting of titanium...lutetium." Applicant therefore earnestly requests reconsideration and allowance of claim 18.

For reasons similar to those provided above in connection with claims 1-5 and 15-17, claim 19 is allowable over the cited reference because Watanabe et al. does not teach or suggest "an envelop...wherein the envelop is made of a glass material that contains an emissive element." Accordingly, Applicant submits that claim 19 is allowable over the cited reference and earnestly requests allowance of claim 19 and claim 20 that depends therefrom.

Claim 21 is allowable over Watanabe et al. because Watanabe et al. does not teach or suggest "an envelop...wherein the envelop is made of a glass material that contains an oxide of at least one element selected from the group consisting of titanium...lutetium," as discussed above in connection with claims 6-8 and 18. Applicant therefore earnestly requests reconsideration and allowance of claim 21.

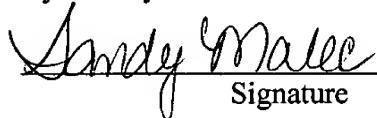
Finally, claim 22 is allowable over Watanabe because the reference does not teach or suggest "a tube being made of a base material...wherein the base material contains an emissive element." Accordingly, Applicant respectfully requests allowance of claim 22.

In view of the foregoing remarks, Applicant submits that the claims are allowable over the cited reference and earnestly requests allowance of all pending claims. The undersigned

requests a phone call if for any reason one or more of the pending claims is considered to not be in condition for allowance.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231 on December 17, 2002.

By: Sandy Malec


Signature

Dated: December 17, 2002

Very truly yours,

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